

What is Claimed is:

[c1] A method for transmitting and receiving high-frequency data signals over power transmission lines, comprising:

coupling and un-coupling high-frequency electrical data signals with a first power transmission line by inductance;

conditioning said coupled and un-coupled high-frequency electrical data signals; and

coupling and un-coupling ^{said conditioned} high-frequency electrical data signals to a first end of a fiber-optic isolator using a light transducer and ^{an optical fiber} ~~a light pipe~~.

[c2] The method of claim [c1], further comprising providing said inductance by positioning said first power transmission line inside a toroid shaped core having a plurality of windings.

[c3] The method of claim [c2], further comprising preventing low frequency power line signal saturation of said core by forming said core with a magnetic material of sufficient permeability.

[c4] The method of claim ~~[c2]~~, further comprising forming said core as two portions with a hinge therebetween to ease installation.

^[c5]
[c5] The method of claim ~~[c1]~~, further comprising inductively providing power for said conditioning and said light transducer using a second toroid surrounding said first power transmission line and including a sufficient number of windings to inductively transfer desired power.

[c6] The method of claim [c5], further comprising forming said second toroid as two portions and joining said portions together with a hinge.

[c7] The method of claim [c1] further comprising coupling said fiber-optic isolator to an interface device for electronic data signal devices.

[c8] The method of claim [c1], further comprising:

coupling and un-coupling light signals from a second end of said fiber-optic isolator using a second ~~light pipe~~ ^{optical fiber} and a second light transducer for high-frequency electrical data signals;

conditioning said coupled and un-coupled high-frequency electrical data signals; and

coupling and un-coupling ^{said conditioned} high-frequency electrical data signals with a second power transmission line by inductance.

[c9] The method of claim [c8], further comprising providing a second inductive power source for at least said second light transducer.

[c10] The method of claim [c1], further comprising providing said coupling, un-coupling and conditioning steps within a protected environment.

[c11] A device for transmitting and receiving high-frequency data signals over power transmission lines, comprising:

an inductor adjacent to a first power transmission line;

^{high-frequency data}

^ signal conditioning circuitry electrically connected to said inductor;

^{high frequency data}
a light transducer electrically connected to said signal conditioning

circuitry;

^{an optical fiber}

~~a light pipe~~ adjacent to said light transducer;

^{optical fiber}
a fiber-optic isolator connected to said ~~light pipe~~ ^{optical fiber}; and

^{high frequency data}
a power source for said signal conditioning circuitry and said light transducer.

[c12] The device of claim [c11] wherein said inductor comprises a toroid shaped core

having a plurality of windings and said inductor is positioned such that said first power transmission line runs through a center of said core.

[c13] The device of claim [c12] wherein said core comprises a magnetic material of sufficient permeability to prevent low frequency power line signal saturation of said core.

[c14] The device of claim [c12] wherein said toroid shaped core comprises two portions joined together with a hinge.

[c15] The device of claim [c11] wherein said power source comprises a second toroid surrounding said first power transmission line and including a sufficient number of windings to inductively transfer desired power.

[c16] The device of claim [c15] wherein said second toroid comprises two portions joined together with a hinge.

[c17] The device of claim [c11], further comprising an interface device coupled to said fiber-optic isolator, said interface device including means to interface with digital appliances.

[c18] The device of claim [c11], further comprising:

optical fiber
a second ~~light pipe~~ adjacent to an opposite end of said fiber-optic isolator;

optical fiber
a second light transducer connected to said second ~~light pipe~~ and electrically connected to a second set of signal conditioning circuitry;

said second set of signal conditioning circuitry electrically connected to a second inductor; and

said second inductor adjacent to a second power transmission line.

[c19] The device of claim [c18], further comprising a second power source for said second set of signal conditioning circuitry and said second light transducer.

3. [c20] The device of claim [c11], further comprising a weather-proof enclosure for at least said inductor, said signal conditioning circuitry, said a light transducer, and said ^{optical fiber} light pipe.

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